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NEARCTIC FLIES OF THE FAMILY PERISCCELIDAE
(DIPTERA) AND CERTAIN ANTHOMYZIDAE
REFERRED TO THE FAMILY

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The family Periscelidae was not recognized by earlier authors, its species being assigned to varying ones of the other acalypterate families. Even when it is recognized as a distinct group there is no agreement as to what genera should be included. My own studies have convinced me that the family is best limited (as concerns the Nearctic region) to the single genus *Periscelis*. (Nearctic species have been assigned to the genera *Microperiscelis* and *Sphyroperiscelis*, not here recognized as distinct.)

There are included here a few notes on exotic Periscelidae, with a list (including references) of the known species of the world and a key to the known genera. I have included *Cyamops* since it has been included in recent accounts. I have also included *Stenomiera*, which has been referred here but neglected by some recent students. In order to place these two genera I have added a discussion of the Anthomyzidae, with a key to the Nearctic genera of that family.

The following abbreviations have been used in designating locations of type specimens: AMNH, for American Museum of Natural History; and USNM, for U. S. National Museum.

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Family PERISCELIDAE

Auxiliary vein rudimentary, ending free (not apically fused with costa or first vein); no costal breaks; anal cell present; first vein ending well distal to basal third of wing; costa ending at apex of third vein; second antennal segment with one or more dorsal apical bristles, rather long third segment arising from its ventral surface; arista plumose; face strongly receding below, extending laterally below the buccae, narrowed below the antennae by the anterior extension of the eyes (the longest diameter of the latter being oblique); bucca extending upward anteriorly, bearing a row of bristles, of which the anterior is placed well above the oral margin; hairs on lateral portions of face; one reclinate orbital bristle; no preapicals on tibiae; postverticals divergent; no presutural dorsocentral; scutellum with four marginal bristles, its disc bare.

Genus *Periscelis* Loew, 1858

I have suggested elsewhere that *Microperiscelis* Oldenberg (type, *Notiphila annulata* Fallén) is antedated by the isogenotypic *Myodris* Lioy and that the genus is scarcely valid. The properties of the new species described here have led me to conclude that *Sphyroperiscelis* Sturtevant is also best considered a synonym of *Periscelis*. There are 11 or 12 species of the family known from the world, and five genera are recognized here, even though *Myodris* and *Sphyroperiscelis* are not accepted (see list, p. 556). For convenience, the use of broad generic limits is desirable here. If both the names under consideration are retained it will not be easy to fit the new species into any of the available categories, and a new genus will be indicated, giving 8 genera for 12 species.

Key to the Nearctic species of *Periscelis*

1. Mesonotum dull gray, with a brown median stripe; posterior crossvein strong.....**P. annulata** (Fallén)
Mesonotum rather shining black; posterior crossvein faint or largely absent...2
2. Antennal bases about as far from each other as each is from eye; posterior crossvein represented by stumps at each end....**P. wheeleri** (Sturtevant)
Antennal bases much nearer each other than to eyes; posterior crossvein complete but faint.....**P. occidentalis**, new species

Female genitalia: I have described the internal reproductive systems of *Periscelis annulata* and *P. wheeleri* (Sturtevant, 1926, p. 7). These species are much alike, and are very different from any other known forms, especially in that they have three chitinized spermathecae that are attached directly to a singly common duct. They are also unusual in that the eggs are blackish brown in color.

The European species of *Periscelis* are known to be most often found about the sap of bleeding trees (see, for example, Oldenberg, 1914), and the South American *P. nebulosa* was also taken on a bleeding tree. All three of the Nearctic species are to be found in the same situations—most often on oak trees east of the Mississippi River, on cottonwoods west of it. I have reared *P. wheeleri* from larvae found in fermenting oak sap, and there can be little doubt that sap is the normal breeding place of all three Nearctic species.

P. annulata has been taken in eastern Massachusetts from June 13 until the end of August, in Missouri in June and July, in South Dakota in June, in Nebraska, New Mexico, and Washington in August, in Texas in October, and in Alabama on May 2. *P. wheeleri* has been taken in Massachusetts from June 18 to August 24; in New Jersey on July 3; and in California on October 24. *P. occidentalis* has been found in California from March 25 to July 30, in Arizona in June and July, and in Washington in August. Evidently all three species have numerous broods, probably overlapping, and may be found throughout the warmer months.

Periscelis annulata (Fallén), 1813

Described from Europe; recorded by Sturtevant (1923) from Alabama, South Dakota, and New Mexico, and by Malloch (1915) from Illinois. From the following locations 48 specimens were examined: Budapest, Hungary (Kertesz); Falmouth, East Falmouth, Woods Hole, and Naushon Island, Mass.; Webster Grove, Mo. (H. D. Stalker); Kushla (Mobile County), Ala.; Austin, Tex. (M. R. Wheeler); Chadron and Oakdale, Nebr. (M. R. Wheeler); Chamberlain, S. Dak.; Mogollon, N. Mex. (M. R. Wheeler). Dr. Wheeler informs me that he also has collected this species at Verlot, Wash. The specimen from Mogollon has the wings clouded on the anterior margin and it may represent a distinct form.

The species was described in the ephydrid genus *Notiphila* and often has been placed in the Drosophilidae; I formerly referred it to the Agromyzidae, and later to the Lonchaeidae; Malloch (1915) has listed it under the Sapromyzidae. This species is the genotype of *Myodris* Lioy, of *Microperiscelis* Oldenberg, and of *Meronychina* Enderlein (*Meronychia* Enderlein). It was described by Malloch (1915) as *Phorticoides flinti* (genus and species both to be included in the synonymy).

Periscelis wheeleri (Sturtevant), 1923

Type from Naushon Island, Mass. (AMNH), and a paratype from the same locality (USNM). From the following locations 24 specimens were examined: Woods Hole and Naushon Island, Mass.;

Mendham, N. J.; and Pasadena, Calif. (M. R. Wheeler). The California specimen is most unexpected, but it is certain that it was collected in Pasadena, and it closely resembles eastern specimens.

This species is the genotype of *Sphyroperiscelis* Sturtevant.

The puparium is rather flattened, tapering at both ends, and, not including posterior spiracular processes, is nearly three times as long as broad. Surface dark brown, granular. There is a conspicuous thornlike process on each lateral margin of each abdominal segment. The posterior spiracles are on tapering divergent processes, each of which is nearly half as long as the maximum breadth of the puparium. There are no stalks to the anterior spiracles.

Periscelis occidentalis, new species

Male. Antennae yellow, brownish dorsally. Frons dark brown, subshining. Face pale yellowish, brown below centrally; entire oral margin silvery white. Mesonotum, scutellum, and humeri subshining black. Pleurae brown. Legs pale yellow, two dark brown annular bands on each femur and each tibia. Wing with rather indistinct broad median darkened area (including anterior crossvein, most of first vein, basal section of third vein, and two basal sections of fourth), and a dark tip. Abdomen black, subshining.

Arista with about 5 rather short branches above, 3 below. No differentiated vibrissae. Face in profile concave above oral margin, with a hump below antennal insertions. Eyes oblique. Frons about three-fifths width of head, as seen from above. Postverticals strong, divergent. Two pairs of dorsocentrals, both postsutural. Acrostichal hairs rather sparse, not in distinct rows. Scutellum with four marginal bristles, anterior pair about half length of posterior ones. One humeral, two notopleurals. Mesopleura bare. No preapical tibial bristles.

First vein ends near middle of wing. Auxiliary vein rudimentary, does not bend anteriorly at apex. Posterior crossvein present but very faint. Second vein strongly curved posteriorly in distal section. Discal and second basal cells separated. Anal crossvein faint. Costal index about 6, fourth vein index about 3. Costa reaches only to apex of third vein.

Length, $2\frac{1}{4}$ mm., wing, 2 mm.

Type from Cottonwood Springs (near Mecca, Riverside County), Calif., May 1939 (USNM 61473). Sixteen paratypes from Cottonwood Springs, Pasadena (M. R. Wheeler), and Lancaster, Calif., Prescott, Ariz. (M. R. Wheeler), and Mogollon, N. Mex. (M. R. Wheeler). Dr. Wheeler states that he also has collected this species at Peshastin, Wash., Patagonia, Ariz., and Fort Davis, Tex.

Exotic Periscelidae

Two current keys to the genera of Periscelidae are confused; the key for the North American forms given by Curran (1934, p. 323), and the key for the genera of the world by Malloch (1932, p. 266). My own familiarity with exotic forms is limited to a single damaged specimen from Colombia in the collection of Cornell University. However, this specimen roused my suspicions of the validity of one of the major characters used in these keys. As a result, at my request C. W. Sabrosky has kindly examined the type specimens of *Marbenia peculiaris* Malloch, *Neoscutops rotundipennis* Malloch, *Scutops fascipennis* Coquillett, and *S. maculipennis* Malloch (all USNM) and reports that in all these the costa reaches only to the third vein.

This is the case also with *Periscelis* (contrary to Curran's key), which means that the first separation given by him is nonexistent if *Cyamops* is removed from the family. A further conclusion then becomes evident: *Panamenia* Curran is a synonym of *Scutops* Coquillett, and *P. chapmani* is doubtfully distinct from *S. fascipennis* Coquillett. The above-mentioned specimen from Colombia is also a *Scutops*, probably best referred to *S. fascipennis*, though the wing pattern is slightly different.

The account by Malloch (1932) is confused in that he says he had not seen the European *Microperiscelis* (*Myodris*), whereas the genotype is *annulata*, with which he was familiar. I think it was *Periscelis* that he had not seen. As indicated above, I do not think that *Myodris* is valid. The first separation in Malloch's key is based on the anterior curvature of the auxiliary vein, and he places *Scutops* in the section without such curvature, which is contrary to the notes of Melander (1913a, p. 167) on the type specimen of *S. fascipennis*, the genotype. It may also be noted that utilization of this character makes *Periscelis occidentalis*, on Malloch's key, run to the neighborhood of *Marbenia*, a genus that seems to me doubtfully distinct from *Periscelis*, though I am not prepared to insist on the point without seeing *Marbenia*.

In view of the above it seems desirable to present a revised key to the genera of the world, even though I have seen only two of the five.

Key to the genera of Periscelidae of the world

(Modified from Malloch, 1932)

- | | |
|--|---------------------------|
| 1. Face hairy over entire surface..... | 2 |
| Face bare in central area..... | 3 |
| 2. Eyes on conspicuous stalks..... | Diopsosoma Malloch |
| Eyes not on stalks..... | Neoscutops Malloch |
| 3. Face conspicuously flattened, more or less shield-shaped, and extending forward below the antennae..... | Scutops Coquillett |
| Face without a projecting shield-shaped area..... | 4 |

4. Face with two conspicuous transverse furrows----- **Marbenia** Malloch
 Face not with two conspicuous transverse furrows----- **Periscelis** Loew

List of the described Periscelidae of the world

(Valid genera are in boldface. Synonyms are in italic. The first species listed under each genus is the genotype)

- Cyamops* Melander, 1913b, p. 291. To Anthomyzidae.
Diopsosoma Malloch, 1932, p. 267.
D. prima Malloch, 1932, p. 267. Perú.
Marbenia Malloch, 1931, p. 31.
M. peculiaris Malloch, 1931, p. 32. Panamá.
Meronychia Enderlein, 1917. Lapsus for *Meronychina*.
Meronychina Enderlein, 1914, p. 327. Synonym of *Periscelis*.
Microperiscelis Oldenberg, 1914, p. 39. Synonym of *Periscelis*.
Myodris Lioy, 1864, p. 1103. Synonym of *Periscelis*.
Neoscutops Malloch, 1926, p. 25.
N. rotundipennis Malloch, 1926, p. 25. Costa Rica.
Panamenia Curran, 1934, p. 323. Synonym of *Scutops*.
Periscelis Loew, 1858, p. 113. Synonyms: *Meronychina*, *Microperiscelis*, *Phorticoides*, *Sphyroperiscelis*, *Myodris*.
P. annulipes Loew, 1858, p. 113. Europe.
P. annulata (Fallén), 1813. (Notiphila.) Europe, United States.
Myodris annulata Lioy, 1864, p. 1103.
Microperiscelis annulata Oldenberg, 1914, p. 39.
Meronychina annulata Enderlein, 1914, p. 327.
Phorticoides flinti Malloch, 1915, p. 87.
P. nebulosa Hendel, 1913, p. 389. Argentina.
P. occidentalis, new species. Western United States.
P. wheeleri (Sturtevant), 1923, p. 2. (*Sphyroperiscelis*.) United States.
P. winnertzi Egger, 1862. Europe.
Microperiscelis winnertzi Oldenberg, 1914, p. 39.
Phorticoides Malloch, 1915, p. 87. Synonym of *Periscelis*.
Podocera Czerny, 1929, p. 93. To Anthomyzidae.
Scutops Coquillett, 1904, p. 97. Synonym: *Panamenia*.
S. fascipennis Coquillett, 1904, p. 97. Central America.
S. chapmani (Curran), 1934, p. 323 (=fascipennis Coquillett?). (*Panamenia*.) Panamá.
S. maculipennis Malloch, 1926, p. 24. México.
Sphyroperiscelis Sturtevant, 1923, p. 1. Synonym of *Periscelis*.

Family ANTHOMYZIDAE

Since *Cyamops* Melander and *Podocera* Czerny, formerly referred to the Periscelidae, are being put in this family, an account of the Nearctic genera is presented.

The following definition of the family is based largely on that of Collin (1944).

Third antennal segment making nearly a right angle with the second; at least one reclinate orbital bristle; postverticals small and convergent, or absent; vibrissae present; no presutural dorsocentrals; mesopleura and disc of scutellum bare; first vein short, not over one-third length of wing; auxiliary faint apically, ending in costa just basal

to first vein; distal costal break represented at least by a definite weakening; tibiae without preapicals.

The antennal structure suggests that of the Periscelidae, but that family is easily distinguished from the Anthomyzidae by its long first vein; complete absence of distal costal break; divergent postverticals.

The members of this family are sometimes treated as belonging to the Opomyzidae, which differ in having presutural dorsocentrals, hairy mesopleura, divergent postverticals, and no true vibrissae. The only Nearctic genus of Opomyzidae known to me is *Geomyza*, which has a large oral bristle that might be considered a vibrissa were it not situated some distance behind the anterior end of the row of oral hairs. The remaining genera listed by Curran (1934) under this family and not included in the key below make up the family Tethinidae. (See Melander, 1951, p. 187.)

Key to the Nearctic genera of Anthomyzidae

1. Upper occiput convex; posterior margin of wing usually absent, making wing very narrow..... *Mutilloptera* Coquillett
Upper occiput concave; wing complete except sometimes with reduced anal angle..... 2
2. Postverticals small; 2 or 3 reclinate orbitals..... 3
Postverticals absent; usually only one conspicuous reclinate orbital; proclinate orbitals present or absent..... 4
3. Second vein sinuate; marginal cell at level of posterior crossvein less than half width of submarginal..... *Ischnomyia* Loew
Second vein greatly curved; marginal cell at level of posterior crossvein more than half width of submarginal..... *Anthomyza* Fallén
4. Yellow species; anal angle of wing rudimentary..... *Stenomiera* Coquillett
Blackish; anal angle well developed..... 5
5. Arista pubescent or short-plumose (branches not longer than length of third antennal segment); no comb of short spines on first femur; no proclinate orbital..... *Mumetopia* Melander
Arista long plumose (branches longer than length of third antennal segment); a comb of short, close-set spines on distal inner flexor surface of first femur; a proclinate orbital..... *Cyamops* Melander

I have not seen *Mutilloptera*, which is perhaps an opomyzid. Of the other genera, the above key is based on examination of the indicated number of species (some Neotropical or Palearctic) of the following genera: *Ischnomyia*, 2; *Anthomyza*, 6; *Stenomiera*, 1; *Mumetopia*, 3; *Cyamops*, 2.

Genus *Cyamops* Melander, 1913

Brues and Melander (1932) and Curran (1934) included *Cyamops* in the Periscelidae. This genus was described as a "geomyzid," and seems to me best placed in the Anthomyzidae, close to *Mumetopia*.

In the keys in both the above works the Periscelidae are separated from the Anthomyzidae (treated as part of the Opomyzidae by

Curran) by the absence, in the former, of a break in the costa just before the apex of the first vein. In *Cyamops* there is no actual break here, but there is a definite weakening of the vein, differing, so far as I can see, in no way from that found in *Mumetopia*.

I have examined the internal female genitalia in *Cyamops nebulosa* Melander. There are three chitinized spherical spermathecae, of which two are attached to a common duct. The two spirally thickened ducts open into a large weakly chitinized pouch that arises from the dorsal surface of the uterus, thus somewhat suggesting the single common duct found in *Periscelis*. There are two parovaria; no sperm or ventral receptacle was found. The other known Anthomyzidae (*Anthomyza*, *Ischnomyia*, and *Mumetopia*) differ in having only two spermathecae and no dorsal uterine pouch. The eggs of *C. nebulosa* are also unusual in that they have two short, thick, anterodorsal filaments suggestive of those found in *Drosophila* or *Parallelomma*. The eggs are white rather than dark blackish brown as in *Periscelis*.

Since the genus may be looked for under the Periscelidae, and since I have available a new species and new data on the one previously described species, a synopsis is given here.

Key to the species of *Cyamops*

1. First tibiae and tarsi yellow, darkened only on terminal tarsal segment; second section of costa at least twice length of third section; two pairs of scutellar bristles..... **C. nebulosa** Melander
- First tibiae and tarsi largely black; second and third costal sections nearly equal in length; one pair of scutellar bristles..... **C. imitata**, new species

Cyamops nebulosa Melander, 1913

I have examined 43 specimens from Middleboro, Rochester, Mashpee, and Woods Hole, Mass., and Dismal Swamp (Cornell University collection) and Lake Drummond (H. S. Barber), Va. Specimens from Woods Hole (the type locality) are in the U. S. National Museum. The species is recorded by Johnson (1925) from Salisbury Cove, Maine, and Woburn, Mass. Mr. Sabrosky informs me that there are specimens in the U. S. National Museum from Beltsville and from near Lloyds (Dorchester County), Md., Alexandria, Va. (bred May 20, 1951, from pupae collected by W. W. Wirth in osmundine bog), La Fayette, Ind., and Jacksonville, Fla.

The original description was based on a male; the female differs in having a distinctly broader face.

In eastern Massachusetts I have found the species easy to collect from June to the end of August by sweeping around the edges of shady sphagnum bogs. Of the 40 specimens so collected in this region, 16 (of both sexes) have no dark pattern on the wings. I had supposed these represented a distinct species, since their body color

is not consistent with the hypothesis that they are teneral. However, through the kindness of Mr. Sabrosky I have seen a mated pair collected at Lake Drummond, Va. (H. S. Barber, June 8-11, 1905), in which the male has the typical pattern of wing clouds while the female has hyaline wings. It seems likely that we are concerned here with dimorphism of a single species, rather than with two species. Mr. Sabrosky reports that the other specimens listed above in the U. S. National Museum collection all have the typical wing pattern.

C. nebulosa is variable in color. In some specimens the legs are wholly yellow, except that the terminal segments of all tarsi are darkened. In others there is more or less darkening of the apical portions of the second and third femora, which in some cases are as dark as in the single specimen of *imitata*. The leg color is not correlated with the clouding of the wings, and is less easily used for a sharp classification into distinct groups of individuals, since intermediates occur.

Cyamops imitata, new species

Female. Subshining black. Orbits silvery; antennae brownish. Legs, including coxae, yellow except brown to black first tibiae and tarsi, apical halves of second and third femora, and apices of second and third tarsi. Palpi and proboscis yellow. Knob of haltere white. Wing clouded, with a hyaline anterior border that includes costal and marginal cells and anterior half of submarginal, except that the apical portion of the latter is wholly clouded distal to a point midway between the ends of second and third veins.

Arista with 8 or 9 long dorsal branches and 2 or 3 distal ventral ones; the 6 or 7 proximal dorsal branches are themselves bifid beyond their middle. One vibrissa; posterior to it are two downward-pointing, long bristles. Clypeus evident, small. A large proclinate orbital and a smaller reclinate one; no ocellars or postverticals; a single (divergent) vertical. Face narrowed by the eyes below the antennae. A single posterior dorsocentral; hairs on mesonotum sparse, not in regular rows; one supra-alar; one post-alar; no humerals; two notopleurals; mesopleura bare; one conspicuous sternopleural; a single (apical) pair of convergent scutellars; no preapicals on tibiae; a long apical on third tibia. Abdomen flattened.

Second and third costal sections nearly equal; last section fourth vein about 2.3 times penultimate section. Third and fourth veins distinctly divergent apically. A conspicuous, erect bristle arising from costa near its base.

Length, 2.5 mm.

Type (USNM 61474) collected at La Fayette, Ind., July 6, 1915 (J. M. Aldrich).

Genus *Stenomicro* Coquillett, 1900

This genus was described as a drosophilid, and is still sometimes referred to that family. Sturtevant (1923) referred it to the "Geomyzidae," and Hendel as well as Brues and Melander (1932) put it in the Asteidae, a reference not favored by Sabrosky (1943). Czerny (1929) described *Podocera ramifera*, from Ceylon, as a periscelid. Hendel and Malloch both point out that *Podocera* is a synonym of *Stenomicro* and that it should not be placed in the Periscelidae. Finally, the British and Fijian genus *Diadelops* Collin (1944, 1951) is evidently a synonym of *Stenomicro*. Collin places this genus in the Anthomyzidae, near *Anagnota*, a disposition that seems appropriate for *Stenomicro*.

Stenomicro was overlooked by Curran (1934). Malloch (1927) has presented a key to the species of the world, of which *Stenomicro angustata* Coquillett is the only known American one.

Stenomicro angustata Coquillett, 1900

Coquillett (1900) recorded this species from Puerto Rico, and Sturtevant (1923) added localities in Pennsylvania, Florida, Alabama, and Louisiana. I have since seen four specimens collected by Dr. H. D. Stalker at Creve Coeur, Mo., about the reedy shores of a fresh-water pond (July 15, 1951).

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